

PATENT APPLICATION
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN APPLICATION OF)
WOLFGANG KAUFHOLD ET AL) GROUP NO: 1711
SERIAL NO.: 09/555,921) EXAMINER: R. SERGENT
FILED: JUNE 6, 2000) RESPONSE TO PAPER NO. 17
TITLE: METHOD FOR PRODUCING)
THERMOPLASTIC POLYURETHANE)
ELASTOMERS)

APPEAL BRIEF

Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:

The present Appeal Brief is submitted in triplicate in support of the Notice of Appeal filed May 29, 2002.

I. REAL PARTY IN INTEREST

The real party in interest for the present Application Serial No. 09/555,921 is Bayer Aktiengesellschaft, of Leverkusen, Germany, by virtue of the assignment executed April 11, 17 and 25, 2000.

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Date

John E. Mrozinski, Jr. Reg No. 46,179

Name of applicant, assignee or
Registered Representative


Signature

July 26, 2002
Date

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II. RELATED APPEALS AND INTERFERENCES

On May 29, 2002, a Notice of Appeal was filed in Application Serial No. 09/555,921. There are no pending appeals or interferences of which Appellants are aware that would be affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

Appellants herewith appeal the final rejection of Claims 1-5, 7 and 9. Claims 1-5, 7 and 9 are pending and stand rejected. Claims 6 and 8 have been canceled. A complete copy of the appealed claims is set forth in the Appendix.

IV. STATUS OF AMENDMENTS AFTER FINAL

An Amendment under 37 CFR § 1.116 was filed on January 28, 2002. In the Advisory Action dated March 5, 2002, the Examiner indicated the rejections set forth in the Final Office Action were maintained for the reasons given in that Action. The references cited by the Applicants (now Appellants) to support their position were not considered because English language translations thereof were not provided.

A Supplemental Amendment under 37 CFR § 1.116 was filed on May 10, 2002, enclosing English translations of the references relied upon by the Applicants (now Appellants) to support their position. In the Advisory Action dated June 7, 2002, the Examiner indicated that the response had been considered, but in view of the claim language, the rejections were maintained.

V. SUMMARY OF THE INVENTION

The present invention relates to a process for the continuous preparation of thermoplastic polyurethane (TPU) elastomers in which one or more polyisocyanates (A) and a mixture (B), with Zerewitinoff-active hydrogen atoms, comprising B1) 1 to 85 equivalent-%, with respect to the isocyanate groups in (A), of one or more compounds with on average at least 1.8 Zerewitinoff-active hydrogen atoms and an average molecular weight \overline{M}_n of 450 to 10000, B2) 15 to 99 equivalent-% (with respect to the isocyanate groups in (A)) of one or more chain lengthening agents

with an average at least 1.8 Zerewitinoff-active hydrogen atoms and a molecular weight of 60 to 400, and 0-20 wt.%, with respect to the total amount of TPU, of further auxiliary agents and additives (C) are homogeneously premixed in a reactor within a period of at most 5 seconds, wherein the difference between the temperatures of components (A) and (B), before entering the reactor, is $<20^{\circ}\text{C}$.

VI. ISSUES ON APPEAL

The following issues are set forth for consideration by the Board:

1. The rejection of Claims 1, 3-5, 7 and 9 under 35 U.S.C. § 102(b or e) as being anticipated by U.S. Pat. No. 5,739,252 issued to Kirchmeyer et al. or U.S. Pat. No. 3,963,679 issued to Ullrich et al.
2. The rejection of Claims 1-5, 7 and 9 under 35 U.S.C. § 103(a), as rendered obvious by U.S. Pat. No. 5,739,252 issued to Kirchmeyer et al. or U.S. Pat. No. 3,963,679 issued to Ullrich et al., each in view of U.S. Pat. No. 3,642,964 issued to Rausch et al.

VII. GROUPING OF THE CLAIMS

With respect to above issue 1, Appellants admit that Claims 1, 3-5, 7 and 9 stand or fall together.

With respect to above issue 2, Appellants admit that Claims 1-5, 7 and 9 stand or fall together.

VIII. ARGUMENT

As will be set forth in detail below, Claims 1, 3-5, 7 and 9 are not anticipated by U.S. Pat. No. 5,739,252 issued to Kirchmeyer et al. or U.S. Pat. No. 3,963,679 issued to Ullrich et al. Further, Claims 1-5, 7 and 9 are not rendered obvious by U.S. Pat. No. 5,739,252 issued to Kirchmeyer et al. or U.S. Pat. No. 3,963,679 issued to Ullrich et al., each in view of U.S. Pat. No. 3,642,964 issued to Rausch et al. Accordingly, the rejections under 35 U.S.C. §§ 102 and 103 should be reversed and favorable action by the Board is respectfully requested.

A. The Invention

The present invention relates to a process for the continuous preparation of thermoplastic polyurethane (TPU) elastomers in which one or more polyisocyanates (A) and a mixture (B), with Zerewitinoff-active hydrogen atoms, comprising B1) 1 to 85 equivalent-%, with respect to the isocyanate groups in (A), of one or more compounds with on average at least 1.8 Zerewitinoff-active hydrogen atoms and an average molecular weight \overline{M}_n of 450 to 10000, B2) 15 to 99 equivalent-% (with respect to the isocyanate groups in (A)) of one or more chain lengthening agents with an average at least 1.8 Zerewitinoff-active hydrogen atoms and a molecular weight of 60 to 400, and 0-20 wt.%, with respect to the total amount of TPU, of further auxiliary agents and additives (C) are homogeneously premixed in a reactor within a period of at most 5 seconds, wherein the difference between the temperatures of components (A) and (B), before entering the reactor, is $<20^{\circ}\text{C}$.

B. The Rejections Under U.S.C. § 102 are Improper

Claims 1, 3-5, 7 and 9 have been rejected under 35 U.S.C. § 102(b or e), as being anticipated by U.S. Pat. No. 5,739,252 issued to Kirchmeyer et al. or U.S. Pat. No. 3,963,679 issued to Ullrich et al. As will be set forth below, Appellants submit that Claim 1, and those claims dependent directly or indirectly thereupon (Claims 3-5, 7 and 9), are not anticipated by the cited art and the rejections thereof should be reversed.

1. The Examiner's Rationale

The Examiner alleged at page 3, first paragraph, of the Final Office Action (mailed November 29, 2001), that,

Patentees disclose the continuous production of polyurethane elastomers, wherein the reactant components are rapidly mixed prior to reaction or at an early stage of the reaction, so as to obtain more uniform mixing and reaction. Kirchmeyer et al. disclose the use of a double screw extruder and Ullrich et al. disclose the use of static mixers. Though patentees are silent regarding the temperatures of the reaction constituents, prior to their entry into the mixer, the position is taken that one would have immediately envisaged, from the prior art, the removal and use from storage of the reactant species. Taken from storage, these species would have had the same temperature. (emphasis added)

The Examiner further assesses the instantly claimed temperature difference as a mere condition that, "...may be satisfied while the reactants are being stored or removed from storage."

2. *The Claimed Compositions are Patentably Distinguishable From the References*

The art, as exemplified by Rausch et al. (U.S. patent 3,642,964 cited in the rejections under 35 U.S.C. §103), and DE 28 23 762 (copy of English translation enclosed herewith for the Board's convenience), has traditionally taught the use of raw materials in liquid form because the conveyance and control of the feeding rate of liquids is much simpler and more efficient. For example, Rausch et al. at col. 5 lines 59-62, teaches that preheating should be sufficient to maintain the reactants in molten, i.e., liquid, state.

The Examiner has failed to point to where Kirchmeyer et al. or Ullrich et al. teaches or suggests that the reactants must meet the instantly claimed temperature difference. Indeed, the Examiner conceded at paragraph number 4, pages 3-4 of the Final Office Action (mailed November 29, 2001), that neither Kirchmeyer et al. nor Ullrich et al. disclosed anything relative to the instantly claimed temperature difference. Appellants respectfully remind the Board that, as stated in MPEP §2131, "to anticipate, the reference must teach every element of the claim."

As those skilled in the art are aware, most isocyanates are liquid at room temperature, whereas most of the polyols used in the production of TPU melt at higher temperatures, i.e., polyols are usually solids at room temperature. Such polyols are commonly stored at higher temperature so as to be a liquid in storage. Therefore, because the materials are to be introduced in liquid form, their introduction at respectively different temperatures has long been the conventional procedure. Support for Appellants' description of the state of the art is provided by the enclosed U.S. Pat. No. 4,597,927 which teaches a polyol/diol mixture that is used at a temperature of 80°C and an isocyanate (diphenylmethane diisocyanate, "MDI") that is used at 50°C. Further supportive of Appellants' position is EP-A 708,124 (copy enclosed), which exemplifies a polyol/diol mixture at 120°C and an MDI at 65°C. Also relevant in the present context, is DE-A 24 18 075 (copy of English translation enclosed herewith for the Board's convenience), which discloses

a polyol/butandiol mixture at 90°C and an MDI at 60°C. The enclosed documents show the state of the art at the time of the invention and thereby clearly refute the Examiner's unsupported assumption that the temperatures for the reactants would be the same.

Further, although the Examiner conceded at Paragraph number 4, pages 3-4 of the Final Office Action (mailed November 29, 2001), that neither Kirchmeyer et al. or Ullrich et al. disclosed anything relative to the instantly claimed temperature difference, the Examiner went on to assert that, "...the use of comparable processing temperatures for reactant streams used for the continuous production of thermoplastic polyurethanes was a known and conventional practice at the time of the invention."

From the above statement, Appellants can only assume that the Examiner has inferred the temperature difference of those references from the initial processing temperatures that are disclosed as, 50 to 250°C in Kirchmeyer et al. (col. 2, line 23) and 90 to 280°C in Ullrich et al. (col. 3, lines 7-8).

Appellants respectfully aver that such an inference is untenable and unsupported by the Examiner. Clearly, one could envisage a large number of possible combinations of temperatures of the relevant reactants that would yield the referenced initial processing temperature. Most of those combinations would not describe the temperature difference of the reactants as instantly claimed. Kirchmeyer et al. and Ullrich et al. provide no teaching or suggestion to guide one in this regard.

Therefore, Claims 1, 3-5, 7 and 9 are not anticipated by U.S. Pat. No. 5,739,252 issued to Kirchmeyer et al. or U.S. Pat. No. 3,963,679 issued to Ullrich et al. and the rejections thereof under U.S.C. § 102(b or e) should be reversed.

C. The Rejections Under U.S.C. § 103 are Improper

Claims 1-5, 7 and 9 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 5,739,252 issued to Kirchmeyer et al. or U.S. Pat. No. 3,963,679 issued to Ullrich et al. each in view of U.S. Pat. No. 3,642,964 issued to Rausch et al. As will be set forth below, Appellants submit that Claim 1 and those claims dependent either directly or indirectly thereupon (Claims 2-5, 7 and 9), are not rendered obvious by the cited combination and the rejections thereof should be reversed.

1. *The Examiner's Rationale*

The Examiner has alleged at paragraphs number 4 and 5, pages 3-4, that

while neither of the primary references disclose the use of reactant streams having comparable temperatures, the use of comparable processing temperatures for reactant streams used for the continuous production of thermoplastic polyurethanes was a known and conventional practice at the time of the invention. The examples of Rausch et al. clearly disclose that the two reactant streams were heated to the same temperature of 140°F (60°C).

Therefore, in accordance with the goals, of the primary references, of obtaining more uniform and homogeneous mixtures, the position is taken that one would have been motivated to introduce the streams for mixing at comparable temperatures (as was done in the secondary reference), so as to arrive at the instant invention.

2. *The Claimed Compositions are Patentably Distinguishable From the Cited Combination of References*

Appellants believe the above-presented argument regarding the rejections under §102 is equally applicable to the rejections under 35 U.S.C. § 103(a) as well, and reiterate their contention that the Examiner has failed to point to where Kirschmeyer et al. or Ullrich et al. describe or suggest the presently claimed temperature difference. The Examiner's assertion that the reactant streams are at equivalent temperatures is in opposition with the state of the art as discussed above. Moreover, the Examiner's contention that Rausch et al., in connection with the temperatures of the reactant feed streams, represents common processing techniques is clearly in error. As noted above, Rausch et al., at col. 5, lines 59-62, teaches that preheating should be to sufficient to maintain the reactants in molten, i.e., liquid, state. The significance of this disclosure in the context of the preparation of TPU has been discussed above.

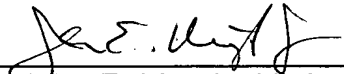
Based on the finding that TPU having improved homogeneity and melting characteristics results from the instantly claimed process, the instantly claimed temperature difference cannot reasonably be taken as resulting from the reactants being stored or removed from storage following the conventional practice.

Thus, the cited combination of references fails to render obvious Claims 1-5, 7 and 9 and therefore the rejections thereof 35 U.S.C. § 103(a) should be reversed

IX. Conclusion

Therefore, for the reasons set forth above, the rejections of Claims 1-5, 7 and 9 under 35 U.S.C. §§102 and 103 are erroneous and the Board's reversal of those rejections is respectfully requested.

Respectfully submitted,

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